

CLAIMS

What is claimed is:

1. A valve assembly comprising:
a body including a central longitudinal axis, a shaped cavity, a fluid entry portion, and a fluid outlet portion;
a valve including a shaped valve head and an elongated portion, the valve head including an exterior surface, a portion of the exterior surface being configured to engage a portion of the shaped cavity to provide a fluid seal; and
a guide that guides the axial movement of the valve, the guide including a centrally disposed opening with a central axis, the opening being configured to receive a portion of the elongated portion of the valve; the guide further including a plurality of radially disposed formations that connect the guide to the body, retain the guide in an axial direction, and position the guide so that the central axis of the guide is substantially aligned with the central longitudinal axis of the body;
wherein a fluid flow path is formed between the valve, the radially disposed formations and the body.
2. A valve assembly as recited in claim 1, including a biasing mechanism that biases the valve head in the direction of the shaped cavity.
3. A valve assembly as recited in claim 1, wherein the valve head engages and disengages with a portion of the shaped cavity to control the flow of fluid through the assembly.
4. A valve assembly as recited in claim 1, wherein the body comprises a single integral component.
5. A valve assembly as recited in claim 1, wherein the radially disposed formations include a front centering formation and a rear centering formation.

6. A valve assembly as recited in claim 5, wherein the front centering formation is positioned at or adjacent the throat area of the body and the rear centering formation is positioned at or adjacent the fluid outlet portion of the body.
7. A valve assembly as recited in claim 5, wherein the front centering formations provide at least three points of contact with the body at or about the throat area and the rear centering formations provide at least three points of contact with the body at or about the fluid outlet portion.
8. A valve assembly as recited in claim 2, wherein the biasing mechanism is disposed between a portion of the guide and a portion of the valve.
9. A valve assembly as recited in claim 2, wherein the biasing mechanism includes a spring.
10. A valve assembly as recited in claim 9, wherein the elongated portion of the valve includes a stem portion and the spring is positioned about a portion of the stem portion.
11. A valve assembly as recited in claim 9, wherein ends of the spring engage an edge of the valve on one side and an edge of the guide on the opposite side.
12. A valve assembly as recited in claim 9, wherein the spring segments are substantially constrained from overlapping along its length by a portion of the valve on one side and by a portion of the guide on the opposite side.
13. A valve assembly as recited in claim 1, wherein the guide supports the valve through its full range of motion.

14. A valve assembly as recited in claim 1, wherein the elongated portion of the valve has a portion with a first diameter and includes a stem portion having a second diameter that is less than the first diameter.
15. A valve assembly as recited in claim 14, wherein the guide includes a surface that engages a segment of the elongated portion and an offset surface that engages a segment of the stem portion.
16. A valve assembly as recited in claim 1, wherein the guide provides a stop to restrain the linear movement of the valve away from the fluid entry portion of the cavity.
17. A valve assembly as recited in claim 1, wherein the fit between a portion of the guide and a portion of the valve provides a dampening effect with respect to the axial movement of the guide.
18. A valve assembly as recited in claim 1, wherein at least one radially disposed formation includes a connection element for connecting the guide to a portion of the body.
19. A valve assembly as recited in claim 1, wherein the radially disposed formations include at least one guide leg.
20. A valve assembly as recited in claim 19, wherein the guide includes three guide legs circumferentially spaced about the guide.
21. A valve assembly as recited in claim 20, wherein the guide legs are spaced at approximately 120 degree intervals.
22. A valve assembly as recited in claim 19, wherein the guide leg is integral with and extends rearwardly from a front centering formation of the guide.

23. A valve assembly as recited in claim 19, wherein the guide leg includes a connection element that engages a portion of the body.
24. A valve assembly as recited in claim 19, wherein there is a gap between a portion of the guide leg and a portion of the guide.
25. A valve assembly as recited in claim 1, wherein the guide includes a portion that tapers radially outwardly.
26. A valve assembly as recited in claim 1, wherein the body includes a groove, recess, or cavity that receives a portion of the guide.
27. A valve assembly as recited in claim 19, wherein the guide includes three guide legs and each guide leg includes a connection element that connects with a portion of the body to retain the guide.
28. A valve assembly as recited in claim 27, wherein the connection element of at least one guide leg is retained by a recess, groove, or cavity formed in the body.
29. A valve assembly as recited in claim 26, wherein the recess, groove or cavity is positioned under a portion of a fitting or other reinforcing component.
30. A valve assembly as recited in claim 1, wherein the valve head and the shaped cavity are comprised of a metal.
31. A valve assembly as recited in claim 1, wherein the surface-to-surface seal between the portions of the valve head and the portion of the shaped cavity is sufficiently tight to prevent leakage.

32. A valve assembly as recited in claim 1, wherein the radially disposed formations exert an outwardly directed radial force to at least partially secure the guide within the body.

33. A valve assembly as recited in claim 1, wherein portions of the shaped valve head and portions of the shaped cavity have a form characterized as a modified ellipsoid.

34. A valve assembly comprising:

an integral body including a central longitudinal axis, a shaped cavity, a fluid entry portion, and a fluid outlet portion;

a valve including a modified-ellipsoid shaped valve head, an elongated portion with a first diameter, and a stem portion with a second diameter that is less than the first diameter, the valve head including an exterior surface that is configured to engage a portion of the shaped cavity to provide a fluid seal;

a means for biasing the valve head in the direction of the shaped cavity;
and

a guide that guides the axial movement of the valve and includes a centrally disposed opening with a central axis, the opening being configured to receive a portion of the stem portion; the guide further including at least two front centering formations, at least two rear centering formations, and at least one guide leg that includes a connection element for connecting the guide to a corresponding groove or recess in the body and the central axis of the guide is substantially aligned with the central longitudinal axis of the body;

wherein the means for biasing is retained between the stem portion of the valve and the body.

35. A method for making a valve assembly comprising:
providing a body including a central longitudinal axis, a shaped cavity, a fluid entry portion, and a fluid outlet opening; a valve having a shaped valve head that includes an exterior surface portion that is configured to engage a portion of the shaped cavity; a guide including a central axis, a central opening for receiving at least a portion of the valve, and a plurality of radially disposed formations that connect the guide to the body;
assembling the guide and the valve so that at least a portion of the valve is disposed in the central opening of the guide;
inserting the guide and the valve into the body through the fluid outlet opening; and
connecting the guide to the body so that guide is substantially retained relative to the body and the central axis of the guide is substantially in alignment with the central longitudinal axis of the body.
36. A method as recited in claim 35, including the providing a biasing mechanism that biases a portion of the valve head to engage the shaped cavity.
37. A method as recited in claim 36, wherein the biasing mechanism is assembled with the guide and valve.
38. A method as recited in claim 36, wherein the biasing mechanism is disposed between at least a portion of the valve and a portion of the guide.
39. A method as recited in claim 35, wherein the radially disposed formation includes at least one guide leg.
40. A method as recited in claim 36, wherein at least one guide leg includes a connection element.
41. A method as recited in claim 40, wherein a portion of the connection element is urged radially outwardly into engagement with a portion of the body.

42. A method as recited in claim 35, including connecting a separate connection device or component to the assembly.